Claims

1. Hydrogel composition comprised of a mixture of (A) water soluble or water dispersible polymer in an aqueous system at least part of which polymer contains at least two groups, which groups are oligomers or co-oligomers at least partly formed from chiral monomers, and (B) water soluble or water dispersible polymer in an aqueous system at least part of which polymer contains at least two groups, which groups are oligomers or co-oligomers which are at least partly formed from chiral monomers with a chirality that is opposite to that of said monomers in mixture (A), such that the chiral part of the oligomers or co-oligomers in mixture (B) are in essence complementary to that of said groups of mixture (A);
in which hydrogel composition the groups on the polymers from mixture (A) give a physical interaction with the groups from mixture (B).

2. Hydrogel according to claim 1 in which the said oligomers or co-oligomers of mixtures (A) or (B) are chosen from the group comprising homo-oligomers of D-lactic acid, random co-oligomers of D-lactide/ε-caprolactone, di- and triblock blends of D-rich poly(lactic acid), poly(D-lactide-co-glycolide), di- and triblock co-oligomers of poly(ethylene glycol)/poly(D-lactic acid), poly(methyl methacrylate), poly(α-methyl-α-ethyl-β-propiolactone), poly(*tert*-butylethylene oxide), poly(*tert*-butylethylene sulfide), poly[β,-(1,1-dichloropropyl)-β-propiolactone], poly(α-benzyl glutamate), poly(methylbenzyl methacrylate), poly(vinyl-*N*-butylpyridium bromide), poly(sodium styrenesulfonate), poly(*tert*-butylthiirane), poly(α-methylbenzyl methacrylate), poly[β-(1,1-dichloroethyl)-β-propiolactone], and mixtures

thereof; and said monomers of the other mixture are formed by the enantiomers of said monomers of the first mixture.

3. Hydrogel composition according to claim 1 or 2, in which a substantial part of said groups of mixture (A) are linked to said polymer of mixture (A) through a moiety which is chemically different from the corresponding linking moiety on the groups of mixture (B).

4. Hydrogel composition according to claim 3, in which one of said moieties in mixture (A) or (B) is a hydroxyl group and the moiety in the other group is a carboxylic acid.

5. Hydrogel composition according to claim 3 or 4, in which the oligomeric groups are derived from bifunctional oligomers that form parallel stereocomplexes.

6. Hydrogel composition according to any one of the preceding claims in which the water soluble or water dispersible polymer is chosen from the group consisting of dextran, starch, cellulose derivates, albumin, lysozym, poly(aminoacids), poly(lysine) and related copolymers, poly(glutamic acid) and related copolymers, poly((meth)acrylates)/((meth)acrylamides), poly(vinylalchohol), poly(ethylene glycol), water soluble polyphosphazenes, or mixtures thereof.

7. Hydrogel according to any one of the preceding claims in which there is a linking group between the water soluble or water dispersible polymer and the oligomeric or co-oligomeric group, which linking group comprises a hydrolysable group.

8. Hydrogel according to any one of the preceding claims, in which the average chain length of the oligomeric or co-oligomeric groups is sufficiently low to render the polymer soluble or dispersible in water.

9. Hydrogel composition according to any one of the preceding claims where the average degree of substitution of the water dispersible polymer with oligomeric or co-oligomeric groups is sufficiently high to obtain a network in which the crosslinks are formed by physical interaction of the water soluble or water dispersible polymers.

10. Hydrogel composition according to any one of the preceding claims where the average degree of substitution of the water soluble or water dispersible polymer with oligomeric or co-oligomeric groups is sufficiently low to render said polymer structure soluble or dispersible in water.

11. Hydrogel composition according to any one of the preceding claims in which the average degree of substitution is from 3 - 25.

12. Hydrogel composition according to any one of the preceding claims in which the oligomeric or co-oligomeric groups of one mixture comprise poly(D-lactic acid) and the oligomeric or co-oligomeric groups of the other mixture comprises poly(L-lactic acid) both with an average chain length of 7-15 monomers.

13. Hydrogel composition according to any one of the preceding claims in which all oligomeric or co-oligomeric groups have equal length.

14. Hydrogel composition according to any one of the preceding claims in which the oligomeric or co-oligomeric groups are grafts.

15. Process for the preparation of a hydrogel which comprises the steps of preparing two mixtures of a substituted water soluble or water dispersible polymer, the preparation of each mixture comprising:

a) polymerization, optionally in the presence of a suitable initiator, of a monomer, where the monomer of one mixture is the enantiomer of the monomer of the other mixture.
b) reaction of the product of the previous step with a suitable coupling compound,
c) reaction of the product of the previous step with said water soluble or water dispersible polymer, and
d) mixing two said mixtures.

16. Process according to claim 15, in which the suitable initiator contains a primary or secondary hydroxyl group.

17. Process according to claim 16 or 17, in which an active ingredient is added before or in step c).

18. Use of two opposite enantiomeric forms of a monomer in an oligomer or co-oligomer which oligomer or co-oligomer are attached to polymeric chains to physically link these polymeric chains.

19. Use of a hydrogel as defined in any of the claims 1-17 in implants.

20. Use of mixture (A) and (B) as defined in any of the claims 1-17 *ex vivo* to form a hydrogel as defined in any of the claims 1-17 *in vivo*.

21. Process for the preparation of a hydrogel as defined in any of the preceding claims 1-17 or 19-20 in the form of microspheres, which process comprises the formation of a two phase system, optionally in the presence of a releasable compound, by choosing two of said water soluble or water

dispersible polymers such that they are incompatible; from which two phase system said hydrogel is formed.

22. Process for the preparation of a hydrogel as defined in any of the preceding claims 1-17 or 19-20 in the form of microspheres which comprises spray drying of at least one water soluble polymer according to any one of the preceding claims, optionally in the presence of a releasable compound.

23. Microspheres obtainable by the process according to claim 21 or 22 which are injectable.